

CWR 4306 – Urban Stormwater Systems Design

Lecture Packet 1: Course Overview

Instructor: Dr. Mark A. Newman

Course Schedule: Fall, 2011

Mon, Wed & Fri 2nd Period (10:40 – 11:30)

Course website:

<http://www.ce.ufl.edu/~markn/CWR4306>

Text Book

Stormwater Conveyance Modeling and Design

Publisher website:

<http://www.bentley.com/en-US/Training/Products/Resources/Books/SCMD.htm>

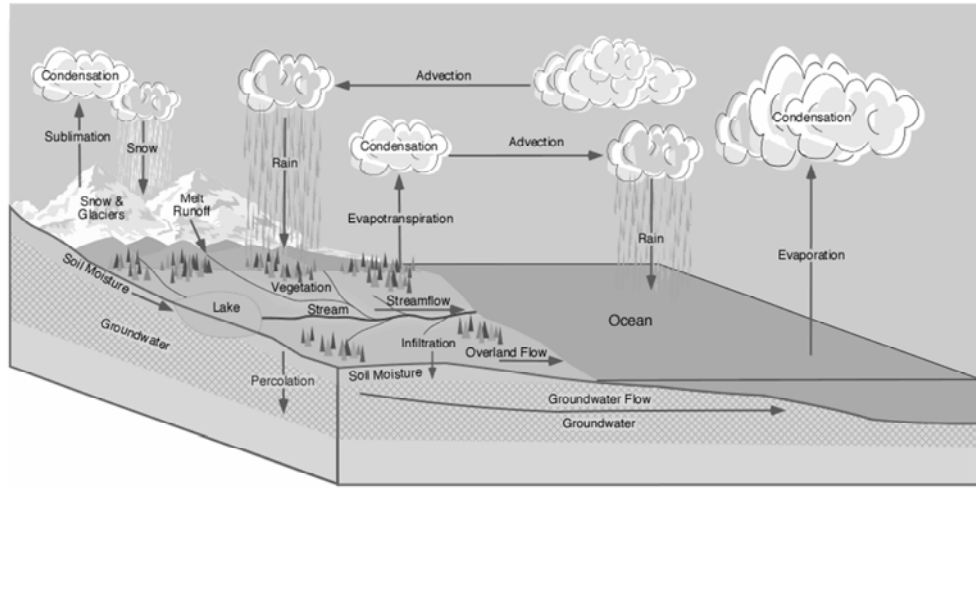
Supplemental Text Book

Computer Applications in Hydraulic Engineering

Publisher website:

<http://www.bentley.com/en-US/Training/Products/Resources/Books/CAiHE7thEd.htm>

Hydrologic Cycle



Hydrologic Cycle

Predominant factors for stormwater design

- Rain (precipitation)
- Evapotranspiration
- Groundwater
 - Infiltration
 - Water table elevation
- Surface water flow
 - Overland flow
 - River & stream flow
 - Open channel flow
 - Pipe flow

Hydrologic Principles

Stormwater design builds upon information from

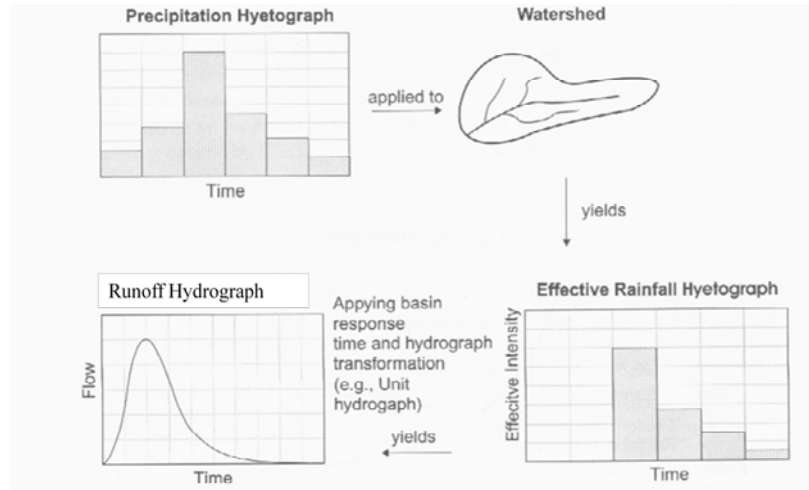
- Hydrodynamics
- Hydraulics
- Hydrology
- General mapping concepts (how to read topography)

Stormwater (Runoff) Management

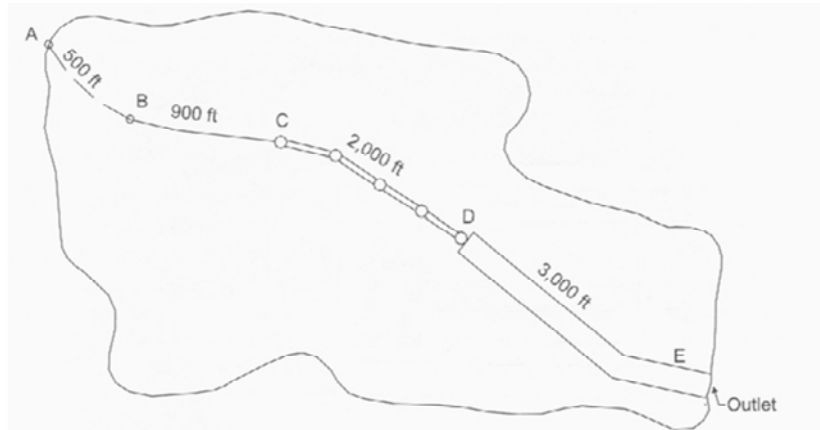
Concerned with controlling the

- Quantity of water
- Quality of water

Summary of stormwater design process

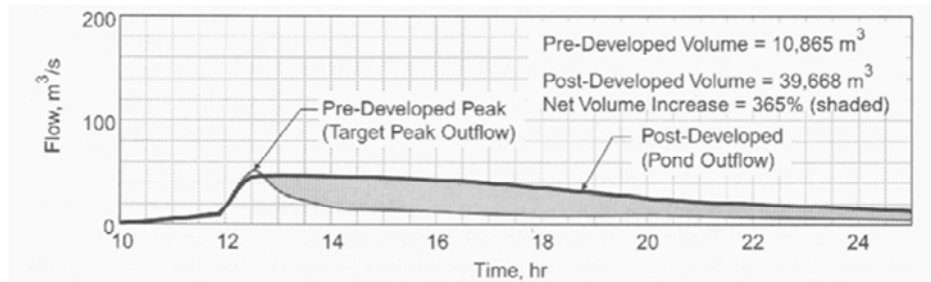


Stormwater Conveyance (varying flow types)



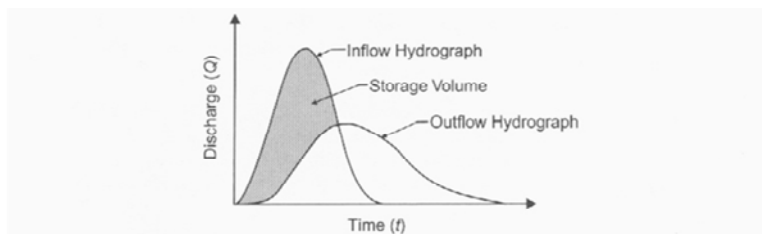
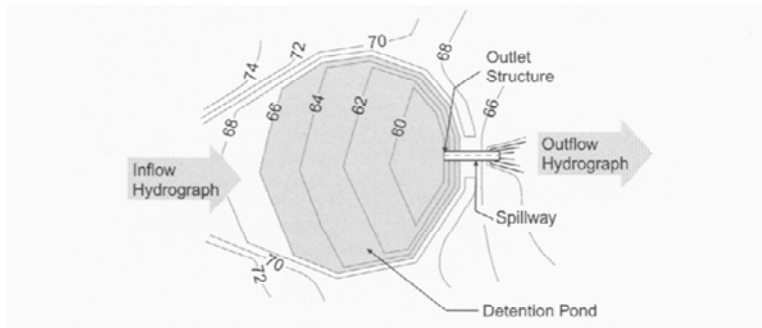
- Overland flow (A-B forest, B-C shallow gutter)
- Storm sewer (C-D pipe flow with manholes)
- Open channel flow (D-E)

Stormwater Runoff

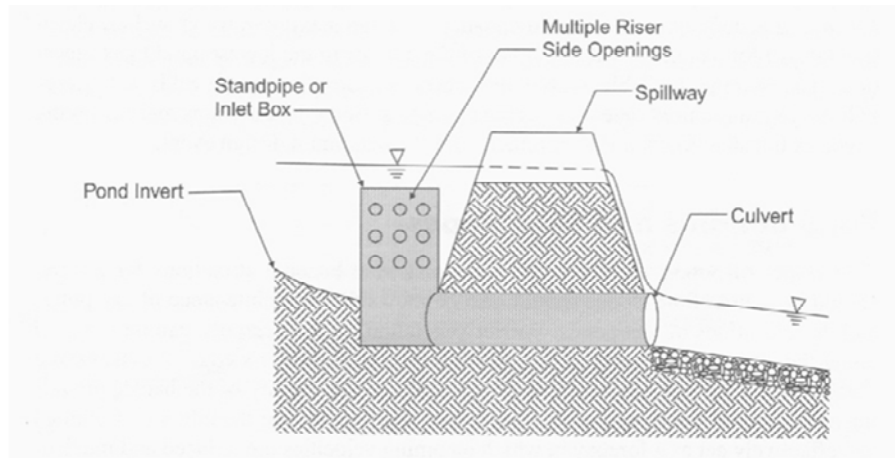


Must assure that the urbanization or development of a site does not increase the peak runoff flow beyond the pre-development conditions.

Stormwater Detention



Stormwater Outlet Structures



Stormwater Regulation – Permitting

Five water management districts in Florida

- Work in conjunction with Florida Department of Environmental Protection
- Responsible for regulating water use (surface water and groundwater)



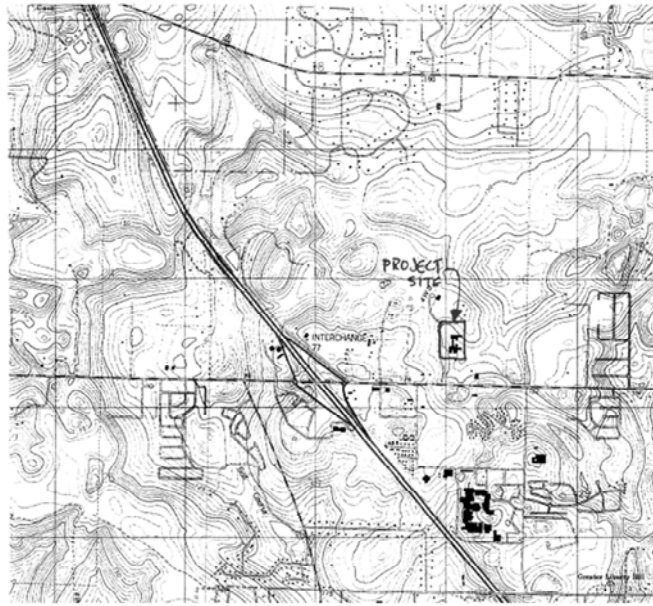
Water Resource Permits

- The state's five water management districts issue several types of permits
- The two most common deal with
 - How much water is used (CUP)
 - How new development affects water resources (ERP)

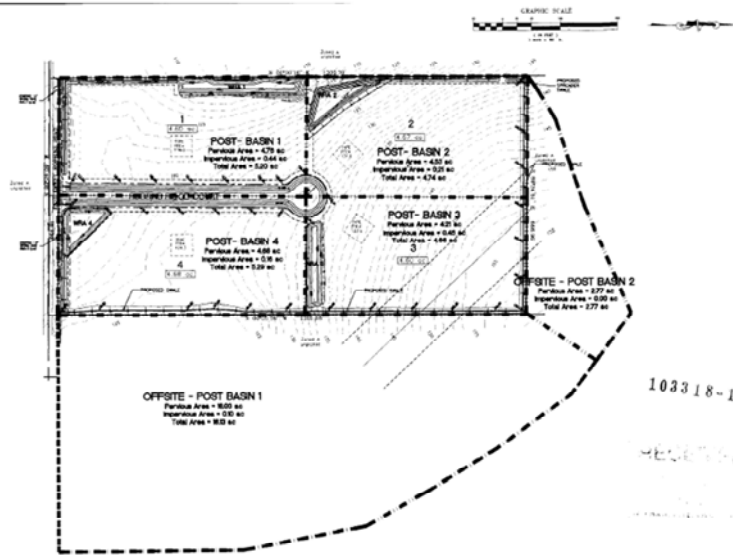
Course outcomes

- Applied understanding of stormwater processes
- Microsoft Excel methods for analyzing hydrologic data
- Experience with Haested Methods software applications for modeling stormwater
- Experience working with site plans and specifications
- Knowledge of the typical sources for obtaining the requisite information for stormwater design problems
- Experience with the Environmental Resource Permit (ERP) application process (St. Johns River Water Management District)
- **PE Exam preparation**—all disciplines for Civil PE exam include stormwater problems.

Course objectives (Typical Final Project)



Course objectives (Typical Final Project)



References

Gribbin. 2002. Introduction to hydraulics and hydrology with applications for stormwater management. New York, NY. Delmar.

Haestad and Durrans. 2003. Stormwater Conveyance Modeling and Design. Waterbury, CT : Haestad Press.